

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
15 July 2004 (15.07.2004)

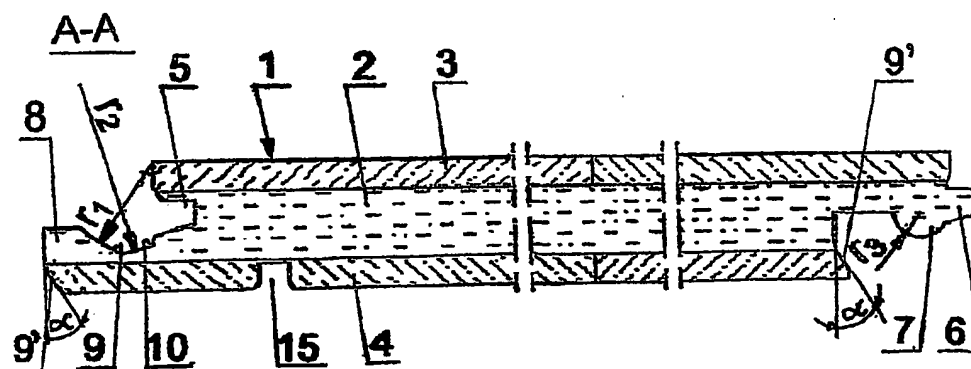
PCT

(10) International Publication Number
WO 2004/059104 A1

- (51) International Patent Classification⁷: **E04F 15/02**,
15/04 Marek [PL/PL]; ul. Gwiazdzista 11 Moczko-
PL-74-320 Barlinek (PL).
- (21) International Application Number:
PCT/PL2003/000147 (74) Agent: **BIEGALA, Teresa**; ul. Bialostocka 28,
PL-71-033 Szczecin (PL).
- (22) International Filing Date:
28 December 2003 (28.12.2003) (81) Designated States (*national*): AT (utility model), AT, BY,
CA, CZ (utility model), CZ, DE (utility model), DE, DK
(utility model), DK, EE (utility model), EE, FI (utility
model), FI, HU, JP, LT, LV, NO, PT, RU, UA, US.
- (25) Filing Language: English (84) Designated States (*regional*): European patent (AT, BE,
BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU,
IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR).
- (26) Publication Language: English
- (30) Priority Data:
P.358084 31 December 2002 (31.12.2002) PL Published:
— with international search report
— before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments
- (71) Applicant (*for all designated States except US*): "BAR-
LINEK" S.A. [PL/PL]; ul. Przemysłowa 1, PL-74-320
Barlinek (PL).
- (72) Inventor; and
- (75) Inventor/Applicant (*for US only*): KONSTANCZAK,

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: FLOOR PANEL



(57) Abstract: The floor panel (1) which, at least at two opposite sides, is provided with coupling parts in the form of a tongue (6) at one side and a groove (5) at the opposite side, wherein the coupling parts are provided with mechanical locking elements in the form of a protrusion (7), which is formed at the tongue, and a lip (8) bordering the groove, is distinguishable by that the bearing surface (9) of the lip (8) at the longer arm of the groove (5) is concave on the arc with the first radius (r_1) whose point of engagement is situated at the upper edge of the panel (1) whereas the protrusion (7) of the tongue (6) has in its cross-section the form of a circular sector with the third radius (r_3) which is shorter than the first radius, wherein the lower part of the lip (8) and the lower part of the panel (1) from the side of the circular protrusion (7) have the second bearing surfaces (9') which are inclined in relation to the vertical plane in one direction, at the first acute angle (α).

WO 2004/059104 A1

5/pets
JC20 Rec'd PCT/PTO 30 JUN 2009

Floor panel

The subject of the invention is a floor panel.

The floor covering, which is well-known of the Polish description of application P324923, consists of hard floor planks (panels) in the form of a rectangle which, at least at the edges of two opposite sides are provided with coupling parts, cooperating with each other. These parts have substantially the form of a tongue and a groove and are provided with integrated mechanical locking means which prevent the drifting apart of two coupled floor panels in a direction perpendicular to the related edges and parallel to the underside of the coupled floor panels. The locking elements are represented in several forms, the common feature of which is that the tongue, in its lower part, is provided with a recess well-fitting by its form to the form of the recess in the lower arm of the groove, whereas the contact surface, making a bearing surface, is inclined to the centre and downwards. According to the first form, the bottom surface of the tongue is convex on the radius whose point of engagement is situated at the upper edge of the floor panel, and on the same radius it is provided a formed recess in the lower arm of the groove. The upper surface of the tongue and the upper wall of the groove are flat and horizontal. The tongue is seated in the groove in such a manner that there is a space between its front surface and the bottom of the groove, where possible rest dust can be pushed by the tongue. Equirounded surfaces of the locking elements make the assembling easier and, at the same time, eliminate a play in a direction parallel to the underside. At the other form of the locking elements, the upper and the lower surface of the tongue and the groove surfaces corresponding with them are formed on the arcs, the radii of which are engaged at the upper edge of the panel, wherein, advantageously, the difference between the radius of the lower surface and that of the upper surface is equal to 2 mm.

At the next form of locking elements, the lower longer arm of the groove is an elastically bendable part which, in the engaged condition, is partially bent, whereby a produced tension force exerts the pressure upon the coupled panels. The lower arm has, near its external edge, a recess, the cross-section of which has the form of a triangle put on its rounded vertex, so that its surface situated nearer the edge, being the surface of contact with the protrusion of the tongue, is inclined towards the centre and downwards at an angle of 30 to 70 degrees. The upper surface of

the groove is flat and horizontal. The tongue has in its front part the form of a trapezoidal wedge, and closer to the core it has in its lower part a protrusion similar in shape to a triangle having a rounded vertex, well-fitting to the form of the recess in the lower arm of the groove. After the floor panels have been coupled, the locking parts prevent the drifting apart of the panels and secure for precise, free of gaps, floor covering.

From the Polish description of application P 349278 it is well-known a floor panel having at the one side a key formed by two rigid arms. One of the two rigid arms is longer than the other. The longer rigid arm has a recess in the form of a trapezoid, which forms an element of the locking joint. At the opposite side, the panel has a tongue provided with a trapezoidal protrusion which is situated at its lower part and which enters the trapezoidal recess in the longer arm of the groove of the adjacent panel, and their contact surface, being bearing surface, is inclined to the centre and downwards.

At any changes of humidity of the surrounding air, especially in case of panels made of hygroscopic material, as for example of wood or wood derivative material, the solutions of this type are less useful because of relatively large material shrinkage and expansion caused by the changes of humidity in the surrounding, which can result in the warping of the floor. The grade of expansion or shrinkage depends on the basic anatomic directions of wood structure and on its sort, which is of essential importance when the properties of floor panels made of the layers of various wood sorts and variable orientation of fibre pattern. The coefficients of shrinkage or the increases in dimensions are different according to the sort of wood, i.e. of pine, oak or beech, at the same value of the change of humidity.

The panel according to the invention is provided with coupling parts in the form of a tongue at the one side and the groove at the opposite side, wherein the coupling parts are provided with mechanical locking elements in the form of a protrusion at the tongue and a lip at the longer arm of the groove, which is characterized in that the bearing surface of the lip is concave along the arc with the first radius whose point of engagement is situated at the upper edge of the panel, whereas the recess of the tongue has in its cross-section the form of a circular sector with the third radius which is shorter than the first radius, wherein the lower part of the lip and the lower part of the panel from the side of the circular protrusion have the second bearing surfaces inclined to the vertical plane in one direction, at the first acute angle, advantageously equal to about 30°. Advantageously, the ratio of the third radius to the first radius is equal to 1:3

approximately. Advantageously, the internal surface of the recess in the longer arm of the groove, which is situated close to the lip, is concave on the arc with the second radius which is longer than the first radius. Advantageously, the ratio of the first radius to the second radius is equal to 1:1,5 approximately. Advantageously, the panel is provided with at least one longitudinal groove situated from the bottom of the panel. The mentioned groove compensates stresses arising near the coupling and creates a ventilation space of the underside. At the one form of the panel, the bearing surface of the lip, near the upper edge of the lip, turns into the flat surface inclined in relation to the vertical plane at the second acute angle equal to, advantageously, 15° , forming a nose which prevent the sliding out of the circular protrusion of the tongue from the recess in the longer arm of the groove. At the other form of the panel, the second internal surface of the recess in the lower arm of the groove is flat and inclined in relation to the horizontal plane at the third acute angle equal to, advantageously, 20° . Near the groove, the second internal surface turns into an offset, the surface of which is flat, inclined in relation to the vertical plane at the fourth acute angle equal to, advantageously, about 38° . At the next form, the panel, on its bearing surface, is provided with a longitudinal recess formed like a trough, in cross-section, the surface of which is concave on the arc with the third radius equal to the radius of the circular protrusion of the tongue. Advantageously, the second internal surface is flat and inclined in relation to the horizontal plane at the third acute angle equal to, advantageously, 20° and near the groove turns into an offset, the surface of which is flat, inclined in relation to the vertical plane at the fourth acute angle equal to, advantageously, about 38° . Advantageously, the floor panel is made of wood or wood derivative layerwise glued material. Advantageously, the floor panel, of all above mentioned forms, is provided, at its short sides, with the groove having the near-rectangular form, in cross-section, on the lower arm of which it has a triangular recess, at one side, whereas at the opposite side the panel has the second tongue of the near-rectangular form which is provided with the protrusion formed like a triangle at its lower part.

The solution according to the invention permits to couple and uncouple easy the floor panels and to keep high rigidity of the floor, and also it ensures that the panels can displace freely when any changes of wood humidity occur, whereby the possibility of the warping of the floor or the destruction of the couplings is eliminated. The forced displacing of the panels, as assembled to a floor plate, each other due to the changes of wood humidity, when the microclimate in a room changes, is stabilized by the pressure of the circular protrusion upon the bearing surface of

the lip at the longer arm of the groove. The lip transmits the load onto the second bearing surfaces at the lower part of the panel, causing controlled movement of the circular protrusion and thereby a light drafting apart of the panels in a direction parallel to the underside. With the decrease of wood humidity the panels revert to the initial position without negative consequences in the form of the loss of rigidity of the floor. The solution according to the invention ensures good ventilation of the underside space, whereby an inconvenient influence of the moisture included in the air on the working parameters of the floor is limited to a certain grade.

The solution according to the invention is explained better in the examples of realization and in the drawings where Fig. 1 shows the panel in top view, Fig. 2 shows the panel in its cross-section, in the plane A-A from Fig. 1, Fig. 3 shows the panel in its longitudinal section B-B from Fig. 1, Fig. 4 shows two panels coupled by means of the coupling parts, as viewed from the front side, Fig. 5 shows an enlarged fragment of the panel provided with the groove, Fig. 6 shows the coupling of two panels in enlargement, Fig. 7 shows two panels being coupled, Fig. 8 shows two coupled panels as viewed from the longitudinal side, Fig. 9 shows a constructional form of the panels in the coupled condition, Fig. 10 shows an enlarged detail of the coupling of the panels shown in Fig. 9, Fig. 11 shows a different constructional form of the coupled panels, Fig. 12 shows an enlarged detail of the coupling of the panels shown in Fig. 11, Fig. 13 shows the next constructional form of the coupled panels, Fig. 14 shows an enlarged detail of the coupling of the panels shown in Fig. 13.

Example 1

The floor panel 1 has the shape of a rectangular plate made of wood or of wood derivative layerwise glued material, consisting of the core 2, face layer 3 and bottom layer 4. At the opposite, lateral longitudinal walls of the panel 1 it is situated at the one side a formed groove 5 having, in cross-section, the form of an unsymmetrical trapezoid, whereas on the opposite wall a tongue 6 in the shape of an unsymmetrical trapezoid which has a circular protrusion 7 on its lower part. The formed groove is limited from the bottom by the longer arm protruded outside the edge of the panel and ended with the lip 8. The lip 8 is formed by the extraction of the material from the longer arm of the groove, wherein this arm makes an element of the locking connection which has, in cross-section, the near-triangular form, the two lateral surfaces of which intersect near the bottom layer 4 of the panel at an obtuse angle. The lateral surface of the recess,

situated on the lip 8, is the bearing surface 9. When the panels are assembled, it contacts to the circular protrusion 7 of the tongue 6 of the other panel and limits the movement of it in a direction parallel to the underside. The bearing surface 9 is inclined to the centre and downwards, is concave and has a curvature with the radius r_1 whose point of engagement is situated at the upper edge of the panel. The other lateral surface of the recess, the internal surface 10, situated between the groove 5 and the lip 8, goes up and at the upper part is united with the surface of the groove 5. The internal surface 10 is concave and has a curvature with the second radius r_2 which is longer than the first radius r_1 . The ratio of the first radius to the second radius $r_1 : r_2$ is equal to 1:1,5 approximately. The circular protrusion 7 of the tongue 6 has the form of a circular sector having the radius r_3 , wherein the ratio of the third radius r_3 to the first radius is equal to 1:3 approximately. The recess in the longer arm of the groove 5 with the lip 8 and the circular protrusion 7 of the tongue 6 of the adjacent panel are locking elements of the coupling, preventing the displacing of the panel in a direction parallel to the underside. Behind the circular recess 7 of the tongue 6, nearer the centre of the panel, it is situated a recess, the width of which is a little larger than the width of the lip 8, and the lip 8 of the adjacent panel enters the mentioned recess. The lower front surfaces of the panel 1, from the side of the mentioned recess and from the side of the lip 8, are inclined in relation to the vertical plane in one direction, at the first acute angle α equal to about 30°. The mentioned surfaces are the second bearing surfaces 9' which transfer pressure forces caused by the expansion of the panel material when it is moistened. The dimensions of the panel are matched, so that, after assembling the panels, in the dry condition, the gap 9 between the second bearing surfaces 9' corresponds to the assumed increase of the linear dimensions of the panels. The mentioned gap is about 0,2 mm wide. At the short, transverse sides of the panel 1 there are coupling parts, at the one side it is the second tongue 11 with a triangular protrusion 12, whereas at the opposite side it is the second groove 13, in the longer arm of which it is situated the second recess 14 formed like an isosceles triangle with the acute vertex. The tongue 11 has, in cross-section, the form of a rectangle with rounded quoin, and the groove 13 has the same form. The panel 1 has in its bottom layer 4 one or several longitudinal grooves 15. The groove 15 secures against excessive stresses which can be caused by tensile forces occurring near the coupling, oriented transversely to the direction of fibre pattern in the middle layer of the panel, which could cause that the panel would crack and laminate. The mentioned groove also makes it possible to ventilate the space under the floor and

to take out fast the humidity given up by the wood from this space. The moist air is lighter than the dry air and so the circulation of the air in the space under the floor is forced intrinsically.

Due to the changes of humidity of the surrounding air, the hygroscopic material of the panel expands or shrinks. During the increase of wood humidity the elements of the bottom and middle layer of the panel become moistened at first. Consequently, the circular protrusion 7 begins to exert pressure upon the bearing surface 9 of the lip 8 with the third pressure force F3. The lip 8 is pressed against the second bearing surface 9' with the fourth force F4, and, consequently, the gap g will be closed. The resistance exerted by the second bearing surfaces 9' causes that the circular element 7 shifts on the bearing surface 9 resulting in the little drifting apart of the panels. Then it follows the increase of wood humidity in the face layer and the increase of its dimensions in a direction transverse to the longitudinal axis of the panel. It comes into being the force cause by the expansion of wood, the first force F1 and the second force F2, increasing the pressure exerted by the circular protrusion 7 upon the bearing surface 9. With the decrease of wood humidity the panels revert to the initial position without negative consequences in the form of the loss of rigidity of the floor.

Example II

A solution analogical to the example I, wherein the bearing surface 9 of the lip 8 near the upper edge turns into the flat surface inclined in relation to the vertical plane at the second acute angle β which is equal to about 15° , forming the nose 16 locking additionally the coupling, preventing the sliding out of the circular protrusion 7 from the recess in the longer arm of the groove.

Example III

A solution analogical to the example II, wherein the second internal surface 17 of the recess in the lower arm of the groove 5 is flat and inclined in relation to the horizontal plane at the third acute angle γ which is equal to about 20° . The internal surface 17 near the groove 5 turns into the flat surface which is flat and inclined in relation to the vertical plane at the fourth acute angle δ which is equal to about 38° . This solution makes mechanical working of the panel easier.

Example IV

A solution analogical to the example I, wherein on the bearing surface 9 there is a recess shaped like a trough 19, the surface of which is concave along the arc with the third radius R3 equal to the radius of the circular protrusion 7. The second internal surface 17 of the recess in the lower arm of the groove 5 is flat and inclined in relation to the horizontal plane at the third acute angle γ

which is equal to about 20° . The internal surface 17, near the groove 5, turns into the offset 18, the surface of which is flat and inclined in relation to the vertical plane at the fourth acute angle δ which is equal to about 38° . When the panels are assembled, the circular protrusion 7 abuts against the trough 19, increasing the rigidity of the coupling.

Patent claims

1. The floor panel in the form of a rectangular plate which, at least at two opposite sides, is provided with coupling parts in the form of a tongue at the one side and a groove at the opposite side, wherein these parts are provided with integrated mechanical locking means in the form of a protrusion shaped on the tongue and a lip bordering the groove which is formed by the extraction of the material along the longer arm of the groove, wherein the bearing surface of the lip is inclined to the centre and downwards, **characterized in** that the bearing surface (9) of the lip (8) at the longer arm of the groove (5) is concave on the arc with the first radius (r_1), the point of engagement of which is situated at the upper border of the panel (1), whereas the protrusion (7) of the groove (6) has, in cross-section, the form of a circular sector with the third radius (r_3) which is shorter than the first radius, wherein the lower part of the lip (8) and at the lower part of the panel (1) from the side of the circular protrusion (7) have the second bearing surfaces (9') inclined in relation to the vertical plane into one direction, at the first acute angle (α)
2. The floor panel according to claim 1, **characterized in** that the ratio of the third radius (r_3) to the first radius (r_1) is equal to about 1:3.
3. The floor panel according to claim 1, **characterized in** that the first angle (α) is equal to 30° approximately.
4. The floor panel according to claim 1, **characterized in** that the internal surface (10) of the recess along the longer arm of the groove, situated close to the lip (8), is concave on the arc with the second radius (r_2), which is longer the first radius (r_1).
5. The floor panel according to claim 4, **characterized in** that the ratio of the first radius (r_1) to the second radius (r_2) is equal to 1:1,5 approximately.
6. The floor panel according to claim 1, **characterized in** that it has at least one longitudinal groove (15) which is situated from the bottom of the panel.

7. The floor panel according to claim 1, **characterized in** that the bearing surface (9) of the lip (8), near the upper edge of the lip, turns into a flat surface, which is inclined in relation to the vertical plane at the second acute angle (β), forming a nose (16).

8. The floor panel according to claim 7, **characterized in** that the second acute angle (β) is equal to 15° approximately.

9. The floor panel according to claim 7, **characterized in** that the second internal surface (17) of the recess in the lower arm of the groove (5) is flat and inclined in relation to the horizontal plane at the third acute angle (γ), wherein the second internal plane (17), near the groove (5), turns into an offset (18) whose surface is flat, inclined in relation to the vertical plane at the fourth acute angle (δ).

10. The floor panel according to claim 9, **characterized in** that the third acute angle (γ) is equal to 20° approximately and the fourth acute angle (δ) is equal to 38° approximately.

11. The floor panel according to claim 1 or 9, **characterized in** that on the bearing surface (9) it is provided with a longitudinal recess shaped like a trough (19), in cross-section, the surface of which is concave on the arc of the third radius (r_3) which is equal to the radius of the circular protrusion (7).

12. The floor panel according to claim 11, **characterized in** that the second internal surface (17) is flat and inclined in relation to the horizontal plane at the third acute angle (γ) and that this surface, near the groove (5), turns into an offset (18) of flat surface inclined in relation to the vertical plane at the fourth acute angle (δ).

13. The floor panel according to claim 12, **characterized in** that the third acute angle (γ) is equal to 20° approximately whereas the fourth acute angle (δ) is equal to 38° approximately.

14. The floor panel according to claim 1, **characterized in** that it is made of wood or wood derivative layerwise glued material.

15. The floor panel according to claim 1 or 7 or 9 or 11, **characterized in** that on the short sides at the one edge it is provided with a groove in the near-rectangular form, in cross-section, the lower arm of which is provided with a triangular recess (14) whereas at the opposite side it is provided with the second tongue (11) in the near-rectangular form, which is provided with the second protrusion (12) shaped like a triangle in its lower part.

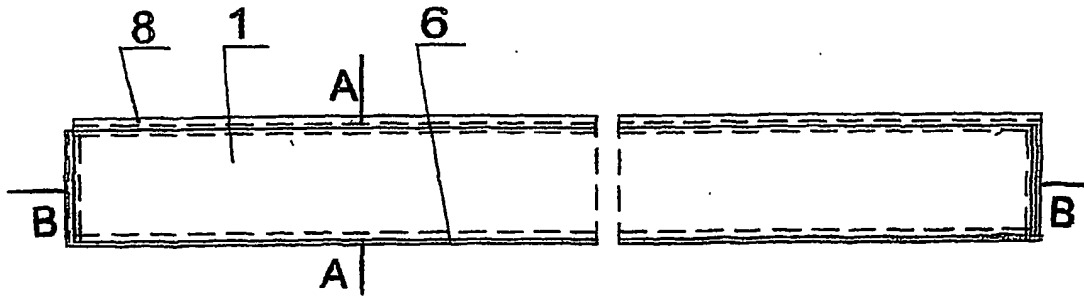


Fig.1

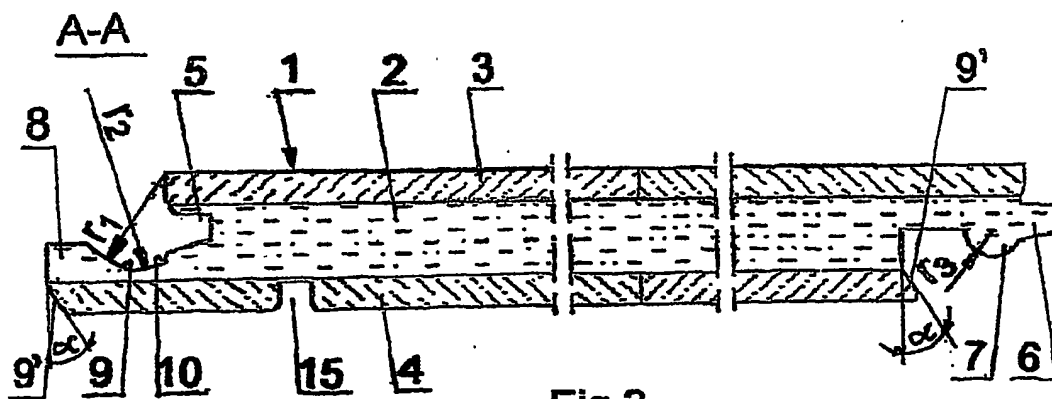


Fig.2

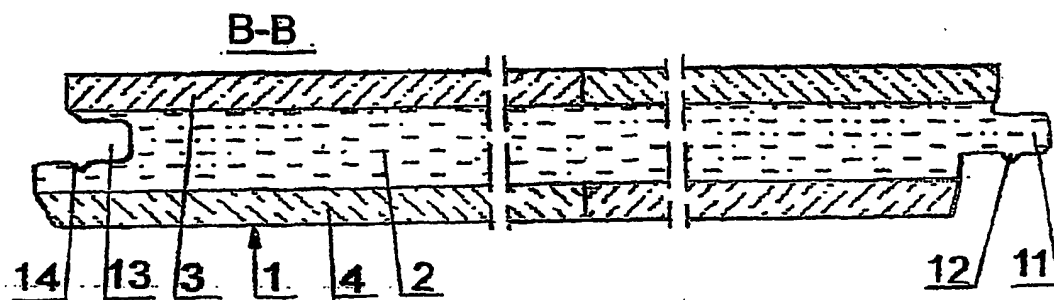


Fig.3

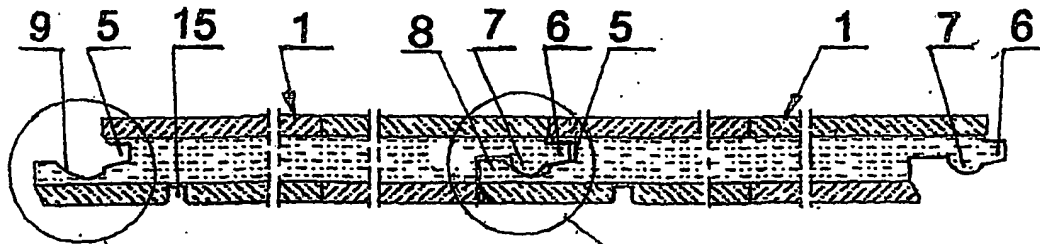


Fig. 4

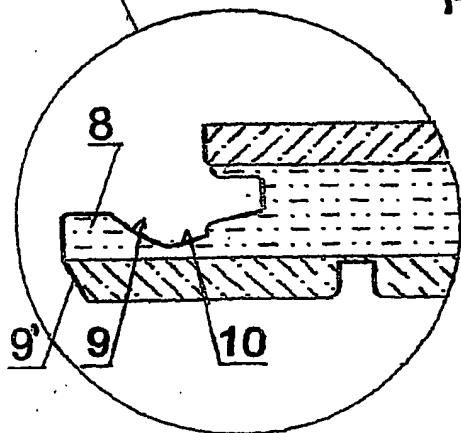


Fig. 5

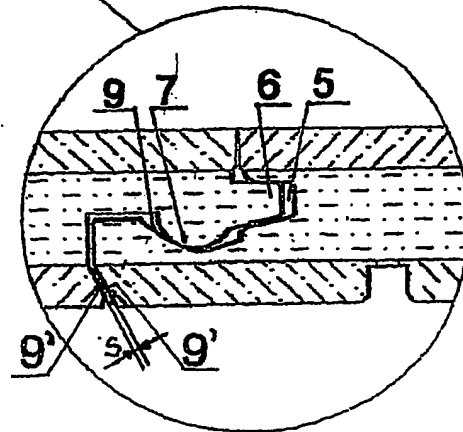


Fig. 6

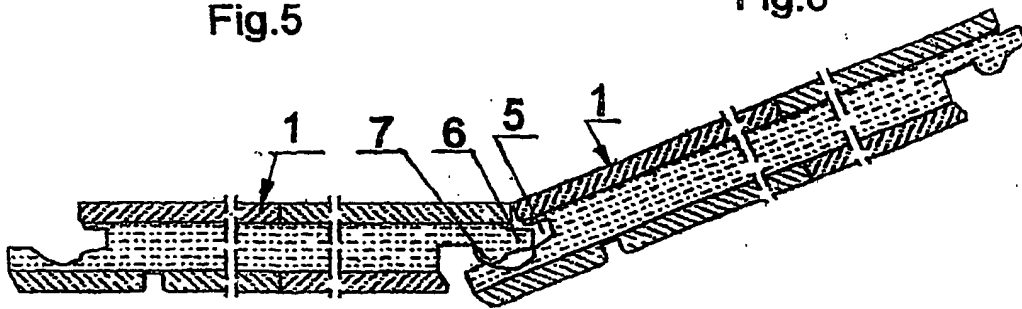


Fig. 7

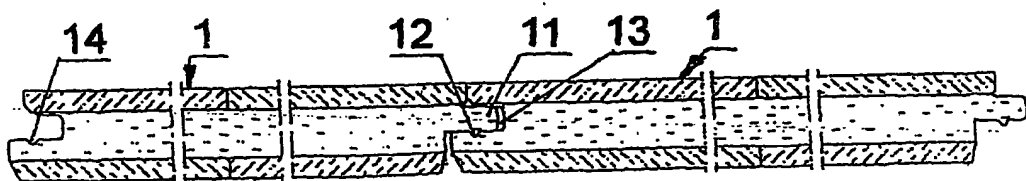


Fig. 8

3/5

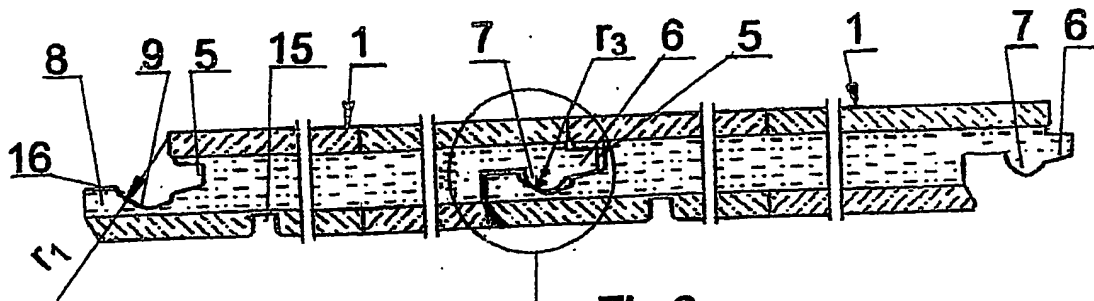


Fig.9

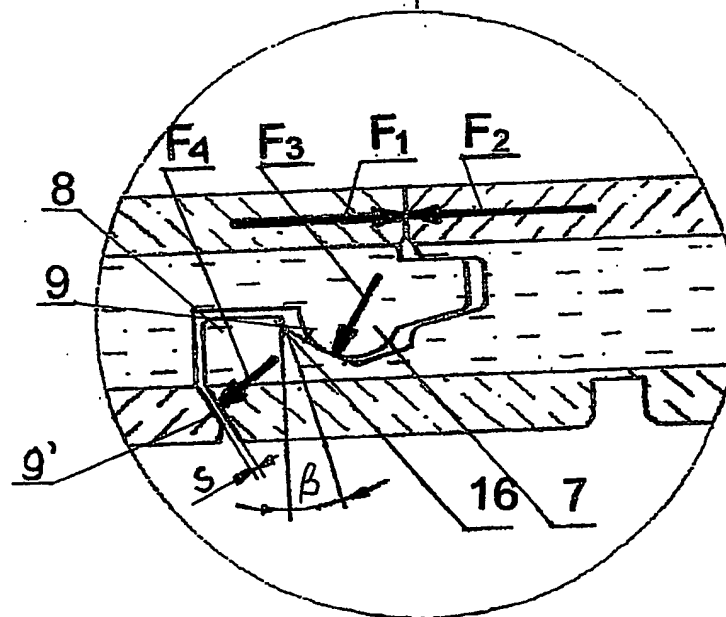


Fig.10

Fig.14

INTERNATIONAL SEARCH REPORT

Intern: Application No
PCT/PL 03/00147

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E04F15/02 E04F15/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E04F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 490 836 B1 (MORIAU STEFAN SIMON GUSTAAF ET AL) 10 December 2002 (2002-12-10) figure 22	1
A	US 2002/007608 A1 (PERVAN DARKO) 24 January 2002 (2002-01-24) figures 4A-7	1
A	WO 01/02671 A (EISERMANN RALF ;AKZENTA PANEELE & PROFILE GMBH (DE)) 11 January 2001 (2001-01-11) figure 2	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- *&* document member of the same patent family

Date of the actual completion of the international search

11 May 2004

Date of mailing of the international search report

18/05/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Severens, G

INTERNATIONAL SEARCH REPORT

Information on patent family members

Interns Application No

PCT/PL 03/00147

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6490836	B1	10-12-2002	
		BE 1010339 A3	02-06-1998
		BE 1010487 A6	06-10-1998
		US 2003024200 A1	06-02-2003
		US 2003029115 A1	13-02-2003
		US 2003024201 A1	06-02-2003
		US 2003029116 A1	13-02-2003
		US 2003029117 A1	13-02-2003
		AT 5566 U1	26-08-2002
		AT 246760 T	15-08-2003
		AT 219812 T	15-07-2002
		AT 196790 T	15-10-2000
		AU 713628 B2	09-12-1999
		AU 3256997 A	07-01-1998
		BG 62216 B1	31-05-1999
		BG 102230 A	30-09-1998
		BR 9702325 A	09-03-1999
		CA 2226286 A1	18-12-1997
		CN 1399051 A	26-02-2003
		CN 1195386 A ,B	07-10-1998
		CZ 9800391 A3	12-08-1998
		DE 1026341 T1	05-07-2001
		DE 1024234 T1	06-09-2001
		DE 29710175 U1	14-08-1997
		DE 29724428 U1	05-04-2001
		DE 29724742 U1	03-07-2003
		DE 69703230 D1	09-11-2000
		DE 69703230 T2	01-03-2001
		DE 69713629 D1	01-08-2002
		DE 69713629 T2	06-02-2003
		DE 69724013 D1	11-09-2003
		DK 1026341 T3	24-11-2003
		DK 1024234 T3	14-10-2002
		DK 843763 T3	29-01-2001
		EG 21186 A	31-12-2000
		WO 9747834 A1	18-12-1997
		EP 1026341 A2	09-08-2000
		EP 1024234 A2	02-08-2000
		EP 1223267 A2	17-07-2002
		EP 1338721 A2	27-08-2003
		EP 0843763 A1	27-05-1998
		ES 2153799 T1	16-03-2001
		ES 2153800 T1	16-03-2001
		ES 2152679 T3	01-02-2001
		GR 3034933 T3	28-02-2001
		HK 1016234 A1	22-11-2002
		HU 9901996 A2	28-10-1999
		ID 17097 A	04-12-1997
		JP 11510869 T	21-09-1999
		NO 980569 A	10-02-1998
		NO 20016048 A	10-02-1998
US 2002007608	A1	24-01-2002	
		SE 515210 C2	25-06-2001
		AU 4701801 A	23-10-2001
		BR 0110152 A	14-01-2003
		CA 2370054 A1	18-10-2001
		CN 1419625 T	21-05-2003
		EP 1272716 A1	08-01-2003
		JP 2003530498 T	14-10-2003

INTERNATIONAL SEARCH REPORT

relation on patent family members

Interns Application No

PCT/PL 03/00147

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002007608 A1		NO 20024128 A	09-12-2002
		SE 0001325 A	25-06-2001
		WO 0177461 A1	18-10-2001
		TR 200202316 T2	21-01-2003
		US 2003115821 A1	26-06-2003
WO 0102671 A	11-01-2001	DE 29911462 U1	18-11-1999
		AT 261037 T	15-03-2004
		AT 222634 T	15-09-2002
		AT 258264 T	15-02-2004
		AU 1546600 A	22-01-2001
		AU 1546800 A	22-01-2001
		CA 2312822 A1	02-01-2001
		CA 2377799 A1	11-01-2001
		CA 2377919 A1	11-01-2001
		WO 0102671 A1	11-01-2001
		WO 0102669 A1	11-01-2001
		WO 0102670 A1	11-01-2001
		DE 29924582 U1	11-12-2003
		DE 50005535 D1	08-04-2004
		DE 59902425 D1	26-09-2002
		DE 59908387 D1	26-02-2004
		EP 1200690 A1	02-05-2002
		EP 1243721 A2	25-09-2002
		EP 1165906 A1	02-01-2002
		EP 1190149 A1	27-03-2002
		ES 2182582 T3	01-03-2003
		US 6505452 B1	14-01-2003